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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/808,253	03/14/2001	Ikuya Tagawa	2500.65308	3355

7590 10/17/2002

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EXAMINER

LE, MINH

ART UNIT

PAPER NUMBER

2652

DATE MAILED: 10/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/808,253

Applicant(s)

TAGAWA ET AL.

Examiner

Minh Le

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \*   c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-10 rejected under 35 U.S.C. 102(b) as being anticipated by Ishi (U.S. Patent No. 5,800,935).

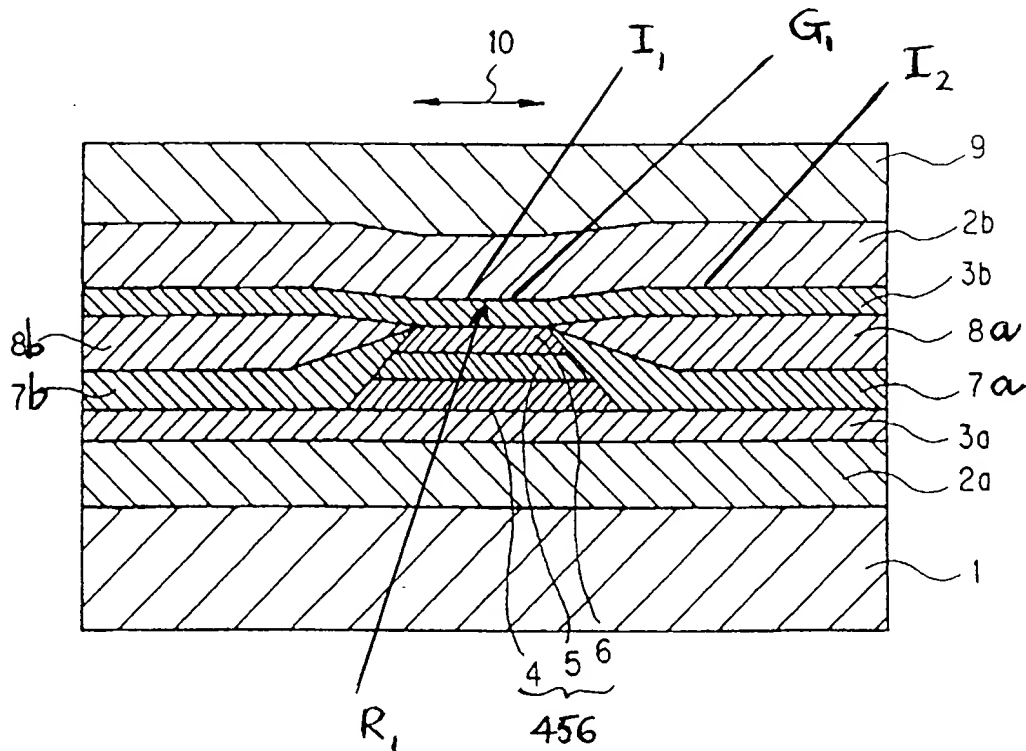
As per claim 1, Ishi shows in Fig.1 a magnetoresistive transducer including a magnetoresistive film 456 extending over a surface of a fundamental layer 3b, a pair of domain control layers 7a, 7b extending over the surface of the fundamental layer 3a so as to interpose the magnetoresistive film 456 along the fundamental layer 3a, and an upper shield layer 2b opposed to the magnetoresistive film 456 at a first interface I<sub>1</sub> extending over a datum plane, said upper shield layer 2b opposed to the domain control layers 7a, 7b at a second interface I<sub>2</sub> over the datum plane (Col. 3, lines 33-44).

As per claim 2, Ishi shows in Fig.1 a magnetoresistive transducer including a fundamental layer 3a that is a lower non-magnetic gap layer spreading over a surface of a lower shield layer 2a (Col. 3, lines 41-44).

As to claims 3 and 8, Ishi shows in Fig.1 a magnetoresistive transducer including an upper non-magnetic layer 3b interposed between the magnetoresistive film 456 and the upper shield layer 2b that contacts the upper non-magnetic gap layer 3b at the first interface I<sub>1</sub> (Col. 3, lines 40-43; Col. 4, lines 1-3).

**FIG. 1**

5,800,935



As to claims 4 and 9, Ishi shows in Fig.1 a magnetoresistive transducer including a lead layer 8a that is made of an Au thin film and interposed between the domain control layer 7a and the upper shield layer 2b (Col. 3, lines 61-66).

As to claims 5 and 10, Ishi shows in Fig.1 a magnetoresistive transducer including an upper non-magnetic gap layer 3b extending over the lead layer 8a and the upper shield layer 2b contacting the upper non-magnetic gap layer 3b at the second interface I2 (Col. 3, lines 40-43; Col. 4, lines 1-3).

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As per claim 6, Ishi shows in Fig.1 a magnetoresistive transducer including a groove G<sub>1</sub> that is formed on the upper shield layer 2b so as to isolate the first and second interfaces I<sub>1</sub>, I<sub>2</sub> from each other.

As per claim 7, Ishi shows in Fig.1 a magnetoresistive transducer including a fundamental layer 3a that is a lower non-magnetic gap layer spreading over a surface of a lower shield layer 2a (Col. 3, lines 41-43).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 11-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Ishi (U.S. Patent No. 5,800,935) in view of Saito (U.S. Patent No. 6,347,022), named Saito022, and in further view of Saito (U.S. Patent No. 6,094,328), named Saito328.

As per claim 12, Ishi shows in Fig.1 a magnetoresistive transducer including a fundamental layer 3a that is a lower non-magnetic gap layer spreading over a surface of a lower shield layer 2a (Col. 3, lines 41-43).

As to claim 13, Ishi shows in Fig.1 a magnetoresistive transducer including an upper non-magnetic gap layer 3b interposed between the magnetoresistive film 456 and the upper shield layer 2b (Col. 3, lines 40-43; Col. 4, lines 1-3).

As to claim 14, Ishi shows in Fig.1 a magnetoresistive transducer including a lead layer 8a that is made of an Au thin film and interposed between the domain control layer 7a and the upper shield layer 2b (Col. 3, lines 61-66).

As to claims 15, Ishi shows in Fig.1 a magnetoresistive transducer including an upper non-magnetic layer 3b that extends over the lead layer 8a and interposed between the upper shield layer 2b and the lead layer 8a (Col. 3, lines 39-46; Col. 4, lines 1-8).

As to claims 11 and 16, Ishi shows in Fig.1 a magnetoresistive transducer including a magnetoresistive film 456 extending over a surface of a fundamental layer 3a, a pair of domain control layers 7a, 7b, which are magnetized in a normal longitudinal direction across the magnetoresistive film 456, and to interpose the magnetoresistive film 456 along the fundamental layer 3a, an upper shield layer 2b opposed to the fundamental layer 3a at a lower interface I<sub>1</sub> so as to hold at least the magnetoresistive film against the fundamental layer 3a, a raised portion R<sub>1</sub> formed on the upper shield layer 2b to swell from the lower interface I<sub>1</sub> toward the fundamental layer 3a, and said upper shield layer covering over at least the magnetoresistive film 456 (Col. 3, lines 25-65; Col. 4, lines 1-8).

Ishi does not teach the product between a height of the raised portion and a magnetization intensity of the upper shield layer that is set smaller than the product between a thickness and a magnetization intensity of the domain control layer, and the upper shield layer magnetized in a reverse longitudinal direction opposite to the normal longitudinal direction.

However, Saito328 teaches the magnetoresistive transducer where the hard magnetic layer (domain control layer) "can be arbitrarily set by appropriate choice of the material and thickness" (Col. 2, lines 64-67; Col. 3, lines 1-6). Therefore, with the known product X between the raised portion and the magnetization intensity of the upper shield layer, the product Y between the thickness and the magnetization intensity of the domain control layer can be set such that  $X < Y$ . And Saito022 shows in Fig. 2 the magnetoresistive transducer wherein a shield bias magnetic field S2 from the upper shield layer flows in direction opposite to the magnetic field Hbfl across the magnetoresistive film (Col. 2, lines 31-63).

Thus, it would have been obvious to one ordinarily skilled in the art at the time of the invention was made to modify the teachings of Ishi with the above teachings from Saito022 and Saito328, to provide a magnetoresistive transducer wherein the magnetic field in the magnetoresistive film and the upper shield layer flow in reverse direction, and the product between a height of the raised portion and a magnetization intensity of the upper shield layer is set smaller than the product between a thickness and a magnetization intensity of the domain control layer. In order to "provide a thin film magnetic head which allows smooth changes in the angle between magnetization directions of magnetic layers in response to change a leakage magnetic field from a recording medium and obtains a continuous reproduction output with little noise", as taught by Saito328 (Col. 2, lines 8-12).

### *Conclusion*

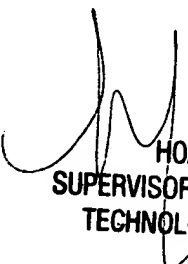
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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Le whose telephone number is (703) 305-7867. The examiner can normally be reached on 10:00AM - 7:00PM (Mon- Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3718 for regular communications and (703) 305-3718 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

ML  
October 9, 2002

  
HOA T. NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600

10/16/02